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| EXAMINER |
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WONG, EDNA

| ART UNIT | PAPER NUMBER |
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1753

DATE MAILED: 05/12/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/961,193

Applicant(s)

BASOL, BULENT M. *SJ*

Examiner

Edna Wong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-72 is/are pending in the application.

4a) Of the above claim(s) 34-72 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-33 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 15 April 2002 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

- 4) Interview Summary (PTO-413) Paper No(s) _____ .
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

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Election/Restrictions

Applicant's election without traverse of Group I, claim **1-33**, in Paper No. 9 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL.

Accordingly, claims **34-72** are withdrawn from consideration as being directed to a non-elected invention.

Drawings

I. The drawings are objected to under 37 CFR 1.83(a) because they fail to show Figures 5D, 5D1 and 5D2 as described in the specification (page 11, line 14 and page 19, lines 9-10, respectively). Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

II. Figures 2a, 2b, 2c, 2e and 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Applicant's specification recites that:

"Figures 2a-2c illustrate a conventional method for filling the features of Fig. 1 with Cu" (page 4, lines 7-8);
"Figure 2E illustrates a cross sectional view of a typical workpiece structure containing the conductor within the feature" (page 11, lines 7-8); and
"Figure 4 illustrates a conventional plating apparatus" (page 11, line 11).

Specification

The disclosure is objected to because of the following informalities:

page 1, line 1, the specification is missing the section of the "Cross-References to Related Applications" (see 37 CFR 1.78 and MPEP § 201.11) to disclose claiming the benefit to US Provisional Application No. 60/280,524, filed March 30, 2001.

page 6, line 2, "4b" should be amended to -- 4e --.

page 11, line 5, "2D" should be amended to -- 2d -- (see Figure 2d).

page 11, line 7, "2E" should be amended to -- 2e --. (see Figure 2e).

page 11, line 14, "5A-5D" should be amended to -- 5a-5d --.

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page 11, line 16, "6A-6E" should be amended to -- 6a-6e -- (see Figure 6).

page 11, line 16, "6DD" should be amended to -- 6dd -- (see Figure 6dd).

page 11, line 16, "6EE" should be amended to -- 6ee -- (see Figure 6ee).

page 16, the words -- (not shown) -- should be inserted after the number "42".

page 29, line 16, "SiO₂" should be amended to -- SiO₂ --.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims 1, 8, 20, 24 and 26 are objected to because of the following informalities:

Claim 1

line 10, a -- ; -- (semicolon) should be inserted after the word "portion".

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Claim 8

line 3, the second period should be deleted.

Claim 20

line 2, the second period should be deleted.

Claim 24

line 2, "as suppressor" should be amended to -- a suppressor --.

Claim 26

line 3, the second period should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 1-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

lines 5-7, "a first portion of the additive becoming adsorbed on the top portion and a second portion of the additive becoming adsorbed on the cavity portion" reads on

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one additive that splits into two parts, i.e., AB → A (adsorbed on the top portion) + B adsorbed on the cavity portion. The claim is unclear if this is not the case.

Claim 9

line 2, the step of “removing the workpiece-surface-influencing device” lacks antecedent basis.

Claim 10

line 2, the step of “removing the workpiece-surface-influencing device” lacks antecedent basis.

Claim 19

lines 1-2, in “one of copper and a copper alloy”, does the plating plate one of each? If not, then the word “and” should be amended to the word -- or --.

Claim 27

line 2, the step of “removing the workpiece-surface-influencing device” lacks antecedent basis.

Claim 33

line 2, the step of “removing the workpiece-surface-influencing device” lacks antecedent

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basis.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-33 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 6,534,116 B2 (Basol). Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-33 of the present invention fail to

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be patentably distinct from the invention claimed in claims 1-30 of the patent because the independent claim of the present invention recites similar limitations, either alone or in combination with its dependent claims, as that of the claims of the patent wherein the claims of the present invention are encompassed by the claims of the patent. Therefore, the claims would have been an obvious variant over each other.

Claim 1 of the present invention recites:

A method of plating a conductive top surface of a workpiece, the conductive top surface of the workpiece including a top portion and a cavity portion, the method comprising the steps of:

applying, over the conductive top surface of the workpiece, an electrolyte solution with at least one additive disposed therein, wherein a first portion of the additive becomes adsorbed on the top portion and a second portion of the additive becomes adsorbed on the cavity portion;

using a workpiece-surface-influencing device to make physical contact with the top portion and establishing relative movement with the workpiece to change at least the first portion of the additive absorbed onto the top portion;

moving the workpiece-surface-influencing device away from the workpiece surface so that the physical contact between the workpiece-surface-influencing device and the workpiece no longer occurs; and

plating the conductive top surface of the workpiece with a conductor obtained from the electrolyte solution at least during a period of time when at least some of the changed is maintained and while the workpiece-surface-influencing device remains moved away from the workpiece surface, thereby causing greater plating of the cavity portion relative to the top portion.

Claim 1 of the patent recites:

A method of plating a conductive top surface of a workpiece, the conductive top surface of the workpiece including a top portion and a cavity portion, the method comprising the steps of:

applying, over the conductive top surface of the workpiece, an electrolyte solution with at least one additive disposed therein, wherein a first amount of the additive becomes adsorbed on the top portion and a second amount of the additive becomes adsorbed on the cavity portion;

applying an external influence to the top portion, the external influence removing from the top portion of the workpiece a part of the first amount of the additive previously adsorbed on the top portion; and

plating the conductive top surface of the workpiece before the additive fully re-adsorbs onto the top portion, thereby causing greater plating of the cavity portion relative to the top portion.

The difference between claim 1 of the present invention and claim 1 of the patent is that claim 1 of the present invention recites:

using a workpiece-surface-influencing device to make physical contact with the top portion and establishing relative movement with the workpiece to change at least the first portion of the additive absorbed onto the top portion; and

moving the workpiece-surface-influencing device away from the workpiece surface so that the physical contact between the workpiece-surface-influencing device and the workpiece no longer occurs.

However, these limitations are an obvious variant of at least claims 1-3 of the patent because the invention of claims 1-3 of the patent is:

applying an external influence to the top portion, the external influence removing from the top portion of the workpiece a part of the first amount of the additive previously adsorbed on the top portion,

wherein the step of applying the external influence (= a workpiece-surface-influencing device) uses a movable mask (= establishing relative movement with the workpiece) applied over the conductive top surface of the workpiece to physically sweep (= moving the workpiece-surface-influence device away from the workpiece surface) the

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first amount of the additive adsorbed on the top portion, thereby reducing the amount of the additive adsorbed on the top portion for a period of time (= to change at least a portion of the first portion of the additive absorbed onto the top portion),

wherein the movable mask in the step of applying the external influence makes a physical contact with the top portion of the workpiece (= to make physical contact with the top portion).

Citations

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP 2001-291954 is cited to teach removing a plating accelerator **22** stuck on the surface of a copper coating **21** except for the inner wall surface including the bottom surface of a via hole **14** and electrolytic copper plating the copper coating **21** (abstract).

Cuneo et al. (US Patent No. 4,080,513) is cited to teach placing a substrate in an accelerator bath to insure that the catalyst has been properly activated in the desired groove recesses of the substrate (col. 2, lines 46-67).

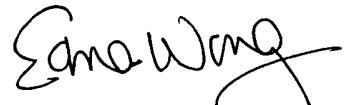
Reid et al. (US Patent Application Publication No. 2001/0015321 A1) is cited to teach the use of an electroplating bath containing metals ions, a suppressor additive, an accelerator additive and an accelerator additive, together with controlling the current density applied to a substrate (page 1, ¶ [008] and [0010]).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (703) 308-3818. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 873-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1495.



Edna Wong
Primary Examiner
Art Unit 1753

EW
May 7, 2003